



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/076,201

02/12/2002

Feng Yang

122-1.1

8601

7590

09/13/2004

Truong Dinh  
Dinh & Associates  
2506 Ash Street  
Palo Alto, CA 94306

EXAMINER

PENDLETON, BRIAN T

ART UNIT

PAPER NUMBER

2644

DATE MAILED: 09/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/076,201

**Applicant(s)**

YANG ET AL.

**Examiner**

Brian T. Pendleton

**Art Unit**

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2002.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION*****Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4, 5, 15, 16, 19, 20, 22, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Hosoi, US Patent 5,754,665. In figure 3, Hosoi discloses a noise canceller for an automobile telephone (cellular phone) comprising microphones 2, 3 and noise suppression unit 1, meeting claims 1, 4, 5, 19, and 20. As to claims 15, 16, and 25 the device can receive far-field or near-field signals and can process each type of signal. The claims do not specify that the device must process each type of signal differently. Regarding claim 22, the apparatus uses the time domain.

3. Claims 1-3, 6-12, 20, 21, 27-30 rejected under 35 U.S.C. 102(e) as being anticipated by Isaka et al, US Patent Publication 2002/0138254. In figure 10, Isaka discloses a method and apparatus for processing speech comprising two input channels ch1, ch2 from signal detectors (inherently microphones), and a speech emphasis section (noise suppression unit) 100. The input channels are coupled to first beamformer 91 and second beamformer 92. Speech emphasis section 100 is shown in figure 13 which digitally processes the signals from the first and second

Art Unit: 2644

beamformers. Claims 1, 2, 20, and 27 are met. As to claim 3, the beamformers 91, 92 (shown in figure 2) have an adaptive filter 2 therefore they and speech emphasis section 100 are implemented within a digital signal processor. Per claims 6, 7, 8, 21, and 28, the speech emphasis section has FFT units 101, 104 to process the first and second signals from the beamformers in the frequency domain using spectral subtraction. Per claim 9, there is disclosed weighting section 108. Step S309 discloses that weighting involves multiplication of the signals from the speech signal transformation (paragraph 121) with weights, therefore inherently there is a multiplier configured to receive and scale the first transformed signal (speech) with a set of coefficients. As to claims 10, 11 and 29, the weights (coefficients) are derived in band weight computation section 107 (step S308) which is based on noise power and speech power computations (units 103, 106). The band weight computation section 107 is the gain calculation unit. The weighting section 108 scales the speech signal based on the weights. Per claims 12 and 30, the circuitry of Isaka provide a time varying noise spectrum estimate.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 13, 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaka in view of Anderson et al, US Patent 6,453,285. Isaka does not disclose an activity detector configured to receive the first and second signals (speech and noise signals) and provide a control indicative of active time periods whereby the first signal includes predominantly the

Art Unit: 2644

desired component. However, it was well known in the art, as evidenced by Anderson, to use activity detectors (speech activity detector 200) in spectral subtraction methods and devices.

Anderson discloses a spectral subtraction method and system comprising speech activity detector 200, speech spectrum estimator 130, noise estimator 120 and spectral gain generator 140. The noise estimator 120 used the output (control signal) from the speech activity detector 200 to generate an estimated noise spectral magnitude signal (figure 2). Use of a speech activity detector 200 greatly improved the accuracy of the noise estimation which in turn enhanced the estimation of the S/N ratio used in the calculation of gain values in a spectral subtraction system. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to use an activity detector in the speech emphasis section 100 of Isaka for the purpose of improving the noise suppression function. Claim 13 is met. As to claim 14, it would have been obvious to one of ordinary skill in the art at the time of invention to adjust the beamformers with the control signal from a speech activity detector for the purpose of maintaining the output signals from the beamformers on the speech and noise signals, respectively, which would have Regarding claim 17, beamformers 91, 92 in figure 2 have an adaptive filter 24 which as modified by Anderson, receives a signal from a speech activity detector to provide a corresponding filtered signal. As to claim 18, paragraph 65 of Isaka discloses the filter 24 uses a LMS algorithm.

6. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Isaka in view of Saruwatari et al. Isaka does not disclose that the microphones are placed close to each other and not in an end-fire type of configuration. Saruwatari disclose a speech enhancement system using a microphone array and beamforming. Figure 1 discloses the microphone array whereby the microphones are in a broadside array. It would have been obvious to one of ordinary skill in the

Art Unit: 2644

art at the time of invention to use a broadside array, as taught by Saruwatari, for the microphones in the invention of Isaka for the purpose of providing an array whereby noise could be easily picked-up separately from the target signal, a feat not efficiently accomplished with an end-fire configuration whereby noise and target signals would be picked up at the same time with no delay. Using a broadside array would exploit a beamforming technique.

### *Conclusion*

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Marash et al, US Patent 6,594,367; Castello Da Costa et al, US Patent 5,740,256; Handel et al, US Patent 6,430,295.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian T. Pendleton whose telephone number is (703) 305-9509. The examiner can normally be reached on M-F 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*2-2-2*  
**BRIAN PENDLETON**  
**PATENT EXAMINER**

September 9, 2004